USSN 09/833,711
Art Unit: 1762

Amendments to Claims

Please amend the claims as follows:

1.(currently amended) A method of depositing an optical quality silica film on a substrate, ~~comprising:~~
wherein said ~~forming said~~ optical quality silica film is deposited on said substrate by plasma enhanced chemical vapor deposition (PECVD) at temperature between 100 and 650°C in the presence of a silicon-containing gas, an oxygen-containing gas, and a carrier gas, comprising:

a) fixing the flow rate of said silicon-containing gas, an oxygen-containing gas, and said carrier gas at predetermined values;

b) depositing silica films on said substrate at different total deposition pressures of said gases between 2.0 and 2.6 Torr;

c) observing the optical characteristics of the deposited silica films to determine the optimum total deposition pressure;

d) depositing said optical quality silica film while controlling said total deposition pressure to said optimum total deposition pressure determined in step c~~es~~ ~~while controlling the total pressure of said gases~~; and

e) subjecting ~~the as-deposit~~said deposited optical quality silica ~~ed~~ film to a low temperature treatment between 400° to 1200°C to minimize the presence of contaminant compounds in said film.

2.(currently amended) A method as claimed in claim 1, wherein said total pressure is ~~controlled~~ selected to minimize the presence of Si-O_x-H_y-Nz compounds after said low temperature treatment.

3.(original) A method as claimed in claim 2, wherein said low temperature treatment is about 800°C.

4.(cancelled)

5.(currently amended) A method as claimed in claim [[4]]3, wherein said total gas pressure is about 2.4 Torr.

6. (currently amended) A method as claimed in claim [[4]]1, wherein said film is deposited in a vacuum chamber whose pressure is maintained by a vacuum pump having a controllable pumping speed, and said total gas pressure is maintained by controlling said pumping speed.

7. (currently amended) A method as claimed in claim [[4]]1, wherein said film is deposited at a temperature between 100 and 650°C.

8.(original) A method as claimed in claim 7, wherein said film is deposited at a temperature of about 400°C.

9.(cancelled)

10.(currently amended) A method as claimed in claim [[9]]1, wherein said ~~reactive~~ silicon-containing gas is selected from the group consisting of: silicon tetra-chloride, $SiCl_4$, silicon tetra-fluoride, SiF_4, disilane, Si_2H_6, dichloro-silane, SiH_2Cl_2, and difluoro-silane, SiH_2F_2 ~~and any other silicon containing gases involving the use of hydrogen, H, chlorine, Cl, fluorine, F, bromine, Br, and iodine, I~~.

11.(currently amended) A method as claimed in claim 10, wherein said ~~oxidation~~ oxygen-containing gas is selected from the group consisting of: oxygen, O_2, nitric oxide, NO_2, water, H_2O, hydrogen peroxide, H_2O_2, carbon monoxide, CO ~~or~~ and carbon dioxide, CO_2.

12.(original) A method as claimed in claim 11, wherein said carrier gas is selected from the group consisting of: helium, He, neon, Ne, argon, Ar or krypton, Kr.

13.(currently amended) A method as claimed in claim [[9]]1 wherein said ~~raw material~~silicon-containing gas is SiH_4, said ~~oxidation~~ oxygen-containing gas is N_2O, and said carrier gas is N_2 ~~carrier gas~~.

14.(currently amended) A method as claimed in claim [[9]]1, wherein the predetermined flow rates of said gases are ~~also controlled~~selected to optimize the quality of the deposited films after said low temperature treatment.

15.(original) A method as claimed in claim 13, wherein the flow rates of said gases are ~~also controlled~~ selected to optimize the quality of the deposited films after said low temperature treatment.

16.(original) A method as claimed in claim 15, wherein the flow rate of the SiH_4 is about 0.2 std liter/min.

17.(original) A method as claimed in claim 16, wherein the flow rate of the N_2O is about 6.00 std liter/min.

18.(original) A method as claimed in claim 17, wherein the flow rate of the N_2 is about 3.15 std liter/min.

19.(original) A method as claimed in claim 1, wherein modifiers are incorporated into said films during deposition to modify the resulting refractive index.

20.(original) A method as claimed in claim 19, wherein said modifiers are selected from the group consisting of: Phosphorus, Boron, Germanium, Titanium or Fluorine.

21.(currently amended) A method of depositing an optical quality silica film on a substrate~~, comprising:~~
wherein ~~forming~~ said optical quality silica film is deposited on said substrate at a temperature between 100 and 650°C by plasma enhanced chemical vapor deposition (PECVD) in the presence of a ~~raw~~ silicon-containing gas~~material gas~~, an ~~oxidation~~ oxygen-containing gas, and a carrier gas, comprising:

a) fixing the flow rate of said silicon-containing gas, an oxygen-containing gas, and said carrier gas at predetermined values;

while controlling the total pressure of said gases to a pressure of between 2.0 to 2.6 Torr; and

b) depositing silica films on said substrate at different total deposition pressures of said gases between 2.0 and 2.6 Torr;

c) observing the optical characteristics of the deposited silica films to determine the optimum total deposition pressure;

d) depositing said optical quality silica film while controlling said total

deposition pressure to said optimum total deposition pressure determined in step c; and

e) subjecting said deposited optical quality silica film to a low temperature treatment ~~subjecting the as-deposited film to a low temperature treatment~~ at about 800°C to minimize the presence of Si-O_x-H_y-Nz compounds after said low temperature treatment.

22.(original) A method as claimed in claim 21, wherein said film is deposited in a vacuum chamber whose pressure is maintained by a vacuum pump having a controllable pumping speed, and said total gas pressure is maintained by controlling said pumping speed.

23.(original) A method as claimed in claim 21, wherein said film is deposited at a temperature of about 400°C.

24.(currently amended). A method as claimed in claim 21, wherein said ~~raw material~~silicon-containing gas is SiH_4, said ~~oxidation~~ oxygen-containing gas is N_2O, and said carrier gas is N_2 ~~carrier gas~~.

25.(currently amended) A method as claimed in claim 24, wherein the flow rate of the SiH_4 is ~~controlled~~ fixed at ~~to be~~ about 0.2 std liter/min, the flow rate of the N_2O is ~~controlled to be~~fixed at about 6.00 std liter/min., and the flow rate of N_2 is ~~controlled to be~~ fixed at about 3.15 std liter/min.

26. (new) A method as claimed in claim 1, wherein said characteristics are the FTIR spectra.

27. (new) A method as claimed in claim 21, wherein said characteristics are the FTIR spectra.